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IS 11747 (1986): corned beef, canned [FAD 18: Slaughter House and Meat Industry]



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IS : 11747 - 1986

Indian Standard

**SPECIFICATION FOR
CORNED BEEF, CANNED**

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MANAK BHAVAN, 9 BAHADUR SHAH ZAFAR MARG
NEW DELHI 110002**

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March 1987

Indian Standard

SPECIFICATION FOR CORNEB BEEF, CANNED

Meat Industry Sectional Committee, AFDC 18

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AMENDMENT NO. 1 MARCH 2004
TO
IS 11747 : 1986 SPECIFICATION FOR CORNED BEEF,
CANNED

(*Page 4, clause 3.1.3, line 1*) — Substitute 'All water circulated in the factory shall be potable conforming to IS 4251 : 1967‡' for 'All water circulated in the factory shall be potable'.

(*Page 4, footnotes*) — Insert the following footnote at the end:

‡Quality tolerances for water for processed food industry.'

(FAD 18)

Reprography Unit, BIS, New Delhi, India

AMENDMENT NO. 2 APRIL 2011
TO
IS 11747 : 1986 SPECIFICATION FOR
CORNED BEEF, CANNED

[Page 7, clause 4.2(d)] – Substitute ‘Net quantity of the contents of the can;’
for ‘Net mass of the contents of the can;’.

[Page 7, clause 4.2(g)] — Insert the following at the end:

- ‘h) Any other marking required under the *Standards of Weights and Measures (Packaged Commodities) Rules, 1977.*’

(FAD 18)

Reprography Unit, BIS, New Delhi, India

Indian Standard

SPECIFICATION FOR CORNED BEEF, CANNED

0. FOREWORD

0.1 This Indian Standard was adopted by the Indian Standards Institution on 16 July 1986, after the draft finalized by the Meat Industry Sectional Committee had been approved by the Agricultural and Food Products Division Council.

0.2 The demand for meat products including beef products has been steadily increasing in the country. In view of the vastness of the country and spread-over of consumers in distant places where fresh beef is not available, it is imperative to meet the requirement by the supply of canned beef. With the growth of industry, the product has already found an avenue for export. This standard is, therefore, being prescribed to help in exercising quality control of canned beef.

0.3 The manufacture of canned beef involves the preparation of beef, its curing, cleaning, cooking, filling and processing.

0.4 In the preparation of this standard, due consideration has been given to the provisions of the *Prevention of Food Adulteration Act, 1954* and the Rules framed thereunder. However, this standard is subject to the restrictions imposed under these, wherever applicable.

0.5 For the purpose of deciding whether a particular requirement of this standard is complied with, the final value, observed or calculated expressing the result of a test or analysis, shall be rounded off in accordance with IS : 2 - 1960*. The number of significant places retained in the rounded off value should be the same as that of the specified value in this standard.

1. SCOPE

1.1 This standard prescribes the requirements and methods of sampling and test for canned, corned beef.

*Rules for rounding off numerical values (*revised*).

2. GENERAL

2.1 The selection of carcass from which corned beef will be prepared for canning shall conform to IS : 2537 - 1963* and may include head meat, heart meat and skirt meat. Prohibited offals include brains, gut, manifold, paunches, udders, reproductive organs, spleen, lungs, livers, kidneys or glands.

3. REQUIREMENTS

3.1 Hygienic Requirements — The material shall be prepared and handled under strict hygienic conditions by persons free from contagious and infectious diseases and only in premises maintained in a thoroughly clean and hygienic conditions and having adequate and safe water supply (*see* IS : 2491 - 1972†) and duly approved and licensed and monitored by the concerned public health authorities. All workers shall use clean and washed white clothings. Necessary precautions shall be taken to prevent incidental contamination of the product from soiled equipment or from personnel suffering from injuries.

3.1.1 All equipment coming in contact with raw materials or products in the course of manufacture shall be kept clean. An ample supply of steam and water hoses, brushes and other equipment necessary for proper cleaning of machinery and equipment shall be available. The equipment may be sterilized by immersion in or swabbing with hypochlorite or other suitable chlorine solution having 200 ppm available chlorine or by steam.

3.1.2 Meat and meat products shall be handled, stored and transported in a manner that will protect them from contamination and deterioration and immediately after slaughter the carcass shall be chilled overnight to bring the temperature at the bone to below 7°C, before they are boned out in an air conditioned work room, the temperature of which shall not be more than 10°C, to ensure that the meat temperature does not rise above 7°C, till the time of cooking.

3.1.3 All water circulated in the factory shall be potable, that used for general purposes is to be chlorinated to have a residual chlorine content of at least 1 ppm after 30 minutes contact time. The retort cooling water shall be super chlorinated to have a residual chlorine content of at least 3 ppm, after a contact time of at least 30 minutes.

3.1.4 Bacteriological controls shall be made on the general purpose and the retort cooling water, and chlorine content of these shall be checked regularly and records kept.

*Specification for beef and buffalo flesh fresh, chilled and frozen.

†Code for hygienic conditions, for food processing units (*first revision*).

3.2 Raw Material

3.2.1 The meat used shall be fresh chilled to below 7°C or may have been stored frozen at a temperature below -18°C for not more than 180 days.

3.2.2 The beef used shall be firm, have a fine texture and good colour. Yellow connective tissue, gristle and sinewy in amounts naturally associated with the flesh may be used. Bone fat, if required, may also be used. Meat shall be trimmed visibly free of bones, bruises, blood clots, major blood vessel or other extraneous matter.

3.2.3 The meat used in the manufacture of corned beef shall be of good bacteriological quality, free from slime and mould growth with no off-colour, off-flavour or off-odour.

3.2.4 *Salt* — Salt used for curing shall conform to IS : 253-1970*.

3.2.5 Sucrose, invert sugar, dextrose (glucose), lactose, maltose, glucose syrup, corn syrup, spices and condiments may be used as optional ingredient. Wherever they are used, they shall be clean, sound, strictly wholesome and in every way fit for human consumption.

3.3 Preparation

3.3.1 The meat shall be precooked and curing ingredient added to the mix before filling into container. Up to a maximum of 5 percent raw minced meat may be added to the mix.

3.4 *Processing* — The filled cans shall be processed at such temperature and pressure and for such length of time as will ensure thorough cooking and adequate sterilization of the finished product without burning, scorching or overcooking.

3.4.1 Retorts should be fully equipped and instrumented to record temperature and pressure. These record shall be maintained for 2 years.

3.5 Finished Product

3.5.1 The corned beef, after chilling to $18^{\circ}\text{C} \pm 1^{\circ}\text{C}$ in the container shall be a solid block (with not more than 2 percent of the net mass in liquid form), and shall slide easily out of the opened container, the product being capable of being sliced into 5 mm thick slices without breaking and without the edges of these becoming ragged. Any gelatine covering produced *in situ* is acceptable.

3.5.2 The product shall be clean and substantially free from staining and contamination from the container. The product shall have no off-flavour or off-odour and these shall be characteristic of cooked canned corned beef.

*Specification for edible common salt (*second revision*).

3.5.3 The product shall be of a pink colour characteristic of corned beef, with no uncured pieces of meat and shall be substantially free from bones, bruises, blood clots, major blood vessels or other extraneous matter. It shall not generally contain large piece of yellow connective tissue, gristle or sinew greater in area than 160 mm² (12.5 mm²).

3.5.4 The bacteriological analysis of the product shall show no evidence of bacterial spoilage or the presence of viable pathogenic or spoilage organisms and the filled cans, after sterilization and when at ambient temperature shall show signs of being under vacuum.

3.5.5 The material shall also conform to the requirements prescribed in Tables 1 and 2.

TABLE 1 REQUIREMENTS FOR CORNED BEEF, CANNED

SL No.	CHARACTERISTIC	REQUIREMENT	METHOD OF TEST, REF TO
(1)	(2)	(3)	(4)
i)	Protein content (N \times 6.25), percent by mass, <i>Min</i>	21.0	IS : 7219 - 1973*
ii)	Moisture, percent by mass, <i>Max</i>	64.0	IS : 5960 (Part 5) - 1971†
iii)	Fat, percent by mass, <i>Max</i>	14.0	IS : 5960 (Part 3) - 1970‡
iv)	Chloride (as NaCl), percent by mass, <i>Max</i>	3.0	IS : 5960 (Part 6) - 1971§
v)	Sucrose, percent by mass, <i>Max</i>	1.0	Appendix A
vi)	Nitrite content (as NaNO ₂), percent by mass, <i>Max</i>	0.015	Appendix B
vii)	Vacuum at 27 \pm 2°C at normal atmospheric pressure, <i>Min</i>	33.33 kN/m ²	Appendix B of IS : 1743 - 1973

*Methods for determination of protein in foods and feeds.

†Methods of test for meat and meat products: Part 5 Determination of moisture content.

‡Methods of test for meat and meat products: Part 3 Determination of total fat content.

§Methods of test for meat and meat products: Part 6 Determination of chloride.

||Specification for mutton and goat meat canned in brine (*first revision*).

TABLE 2 LIMITS FOR METALLIC IMPURITIES AND MICROBIOLOGICAL ACTIVITY

SL No.	CHARACTERISTIC	REQUIREMENT	METHOD OF TEST (REF TO APPENDIX IN IS : 1743 - 1973*)
(1)	(2)	(3)	(4)
i)	Arsenic, ppm, <i>Max</i>	1	B
ii)	Lead, ppm, <i>Max</i>	5	C
iii)	Copper, ppm, <i>Max</i>	20	D
iv)	Zinc, ppm, <i>Max</i>	50	E
v)	Tin, ppm, <i>Max</i>	250	F
vi)	Microbiological	To satisfy the requirements of the test	G

NOTE — Requirements for Items (i) to (v) are calculated as total contents of a can.

*Specification for mutton and goat meat canned in brine (*first revision*).

4. PACKING AND MARKING

4.1 Packing

4.1.1 Packing in Cans — The material shall be packed in suitable open top sanitary cans. The cans shall be cleaned with hot water before filling and washed from outside after filling and before sterilizing. After sterilization the containers shall not be handled until they are at ambient temperature and dry. The cans shall be either plain or internally lacquered and hermetically sealed. When lacquered, the lacquer shall not be fat soluble and such that it will not be destroyed, altered or its components transferred to the material during processing or subsequent storage and transport.

4.1.2 Packing in Cases — The cans shall be packed in suitable cases. The number of cans in each case shall be subject to agreement between the purchaser and the packer.

4.2 Marking — The labelling of the cans may be done either by printing or lithographing on the cans or by attaching labels printed on paper subject to agreement between the purchaser and the packer, and shall bear the following information in addition to any other information required under *Prevention of Food Adulteration Act and Rules*:

- a) Name of the material along with brand name, if any;
- b) Name and address of the packer;
- c) Name of the ingredients in descending order;
- d) Net mass of the contents of the can;
- e) Batch or code number — embossed indelibly on the can;
- f) Declaration to the effect that no artificial colouring matter has been used;
- g) Warranty period, if any.

4.2.1 Each container may also be marked with the ISI Certification Mark.

NOTE — The use of the ISI Certification Mark is governed by the provisions of the Indian Standards Institution (Certification Marks) Act and the Rules and Regulations made thereunder. The ISI Mark on products covered by an Indian Standard conveys the assurance that they have been produced to comply with the requirements of that standard under a well-defined system of inspection, testing and quality control which is devised and supervised by ISI and operated by the producer. ISI marked products are also continuously checked by ISI for conformity to that standard as a further safeguard. Details of conditions under which a licence for the use of the ISI Certification Mark may be granted to manufacturers or processors, may be obtained from the Indian Standards Institution.

5. SAMPLING

5.1 Sampling of canned corned beef shall be done according to the method prescribed in Appendix H of IS : 1743 - 1973*.

6. TESTS

6.1 Test shall be carried out as prescribed in relevant appendices specified in col 4 of Tables 1 and 2.

6.2 **Quality of Reagents** — Unless specified otherwise, pure chemicals and distilled water (*see* IS : 1070 - 1977†) shall be employed in tests.

NOTE — ' Pure chemicals ' shall mean chemicals that do not contain impurities which affect results of analysis.

APPENDIX A

[Table 1, Sl No. (v)]

DETERMINATION OF SUCROSE CONTENT

A-1. REAGENTS

A-1.1 Stock Solution of Invert Sugar — Weigh accurately 9.500 g of pure sucrose on a watch glass and transfer it to a one-litre volumetric flask with 100 ml water. Add 5 ml of concentrated hydrochloric acid (sp gr 1.9). Allow this to stand for 3 days at 20°C and then make up to volume with water. (This is stable for several months.)

A-1.2 Standard Solution of Invert Sugar — Pipette 50 ml of the stock solution of invert sugar (*see* A-1.1) in a 250-ml volumetric flask. Neutralize carefully with sodium hydroxide of about one percent (w/v) and make up to the volume.

A-1.3 Methylene Blue Indicator Solution — Dissolve 1.0 g of methylene blue in water and dilute to 100 ml.

A-1.4 Fehling's Solution (Soxhlet Modification) — Prepare by mixing immediately before use, equal volumes of solution A, prepared as described under A-1.4.1, and solution B, prepared as described under A-1.4.2.

A-1.4.1 Solution A — Dissolve 34.639 g of copper sulphate ($\text{CuSO}_4 \cdot 5\text{H}_2\text{O}$) in water, and 0.5 ml of concentrated sulphuric acid of sp gr 1.84 (conforming to analytical reagent grade of (IS : 266 - 1977‡), and dilute to 500 ml in a volumetric flask. Filter the solution through prepared asbestos.

*Specification for mutton and goat meat canned in brine (*first revision*).

†Specification for water for general laboratory use (*second revision*).

‡Specification for sulphuric acid (*second revision*).

A.1.4.2 Solution B — Dissolve 173 g of Rochelle salt [potassium sodium tartrate ($\text{KNaC}_4\text{H}_4\text{O}_6 \cdot 4\text{H}_2\text{O}$)] and 50 g of sodium hydroxide, analytical reagent (conforming to IS : 376 - 1976*) in water, dilute to 500 ml in a volumetric flask and allow the solution to stand for two days. Filter this solution through prepared asbestos.

A-1.4.3 Standardization of the Fehling's Solution — Mix equal quantities of Fehling's solution (50 ml of A and 50 ml of B). Accurately pipette out 10 ml of the mixed solution into a 250 ml Erlenmeyer flask. Add 25 to 50 ml of water. Take the standard invert sugar solution prepared by inversion of sucrose in a 50 ml burette. Add to the mixed Fehling's solution almost the whole of the standard invert sugar solution (18 to 19 ml) required to effect the reduction of all the copper, so that not more than 1 ml will be required later to complete the titration. Heat the flask containing the cold mixture over a hot plate or burner covered, with asbestos filled wire gauge. When the liquid begins to boil, keep it in moderate ebullition for 2 min. Without removing from the flame, add 3 drops of methylene blue indicator solution and complete the titration in a further one minute, so that the reaction mixture boils altogether for 3 min without interruption. The end point is indicated by the decolourization of the indicator. Note the volume of the sugar solution required for complete reduction of 10 ml of Fehling's solution. The equivalent volume should be 20.37 ± 0.05 ml.

NOTE — Small deviations from the tabulated factors may arise from variations in the individual procedures or composition of the reagents. If the variation is too wide, adjust the concentration of the Fehling's solution to 20.37 ± 0.05 ml.

$$\text{Factor for Fehling's solution (g of invert sugar)} = \frac{\text{Titre} \times 2.5}{1\,000}$$

A-1.5 Neutral Lead Acetate — Dissolve 100 g of lead acetate [$\text{Pb}(\text{CH}_3\text{COO})_2 \cdot 3\text{H}_2\text{O}$] in distilled water and dilute to one litre.

A-1.6 Sodium Phosphate — Potassium Oxalate Solution — Dissolve 70 g of disodium hydrogen phosphate, dodecahydrate ($\text{Na}_2\text{HPO}_4 \cdot 12\text{H}_2\text{O}$) and 30 g of potassium oxalate ($\text{K}_2\text{C}_2\text{O}_4 \cdot \text{H}_2\text{O}$) in water and dilute to one litre.

A-1.7 Sodium Hydroxide Solution — Approximately 1 N, prepared by dissolving sodium hydroxide analytical reagent.

A-1.8 Concentrated Hydrochloric Acid — sp gr 1.029 at 20°/4°C.

A-2. PREPARATION OF SAMPLE

A-2.1 Weigh 25 g of filtered (Whatman No. 4) sample and transfer to 250-ml volumetric flask. Add about 100 ml of water and neutralize

*Specification for sodium hydroxide, analytical reagent (second revision).

with 1 N NaOH. Add 2 ml of lead acetate solution. Shake and let it stand for 10 min. Add the necessary amount of potassium oxalate solution to remove the excess of lead, make up to volume with water and filter.

A-3. PROCEDURE

A-3.1 Method of Titration — The sugar solution should be neutral. The concentration of the sugar solution should be such that the titre value ranges between 15 and 50 ml. For this purpose, adjust the sugar concentration in the solution taken for titration so as to contain 0.1 to 0.3 g of sugar per 100 ml when 10 ml of mixed Fehling's solution is used. Initially, titrate by the incremental method. When the correct dilutions are established, perform subsequent titrations by the standard method.

A-3.1.1 The Incremental Method of Titration — Pipette 10 ml of the mixed Fehling's solution into a 250-ml flask. Add from the burette, sugar solution sufficient to reduce almost completely the Fehling's solution used. Mix and heat to boiling on hot plate or burner covered with a clean asbestos filled wire gauze. Boil for 15 seconds. If the colour remains blue (indicating that Fehling's solution is not completely reduced), add further 2-3 ml of the sugar solution. Boil the solution for a few seconds after each addition until only a faintest perceptible blue colour remains. Add 3 drops of methylene blue solution and complete the titration by adding the sugar solution dropwise until the indicator is completely decolourized. Record the volume of solution required. The accuracy of the incremental method is increased by attaining the end point as rapidly as possible and by maintaining a total boiling period of 3 minutes.

A-3.1.2 Standard Method of Titration — Pipette 10 ml of mixed Fehling's solution into each of two 250-ml Erlenmeyer flasks. Fill the 50 ml burette with the solution to be titrated. Run into the flask almost the whole volume of sugar solution required to reduce the Fehling's solution so that 0.5 ml to 1.0 ml is required later to complete the titration.

A-3.1.3 Mix the contents of the flask, heat to boiling and boil moderately for 2 min. Then add 3 drops of the methylene blue solution, taking care not to allow it to touch the side of the flask. Complete the titration within 1 min by adding 2 to 3 drops of sugar solution at 5 to 10 seconds interval, until the indicator is completely decolourized. At the end point, the boiling liquid assumes the brick-red colour of precipitated cuprous oxide, which it had before the indicator was added. Note the volume of the solution required.

NOTE — The indicator is so sensitive that the end point can be determined within one drop of the sugar solution. This is usually indicated by the whole reaction liquid becoming bright red or orange in colour. In case of doubt, remove from the flame and hold the flask against a sheet of white paper on the bench. The liquid will appear bluish if the indicator is not completely decolourized. Do not interrupt the boiling for more than a few seconds as the indicator undergoes back oxidation rapidly when air has free access into the flask.

A-3.2 Total Sugars — Pipette 50 ml of the clarified solution into a 250-ml Erlenmeyer flask. Add 5 g of citric acid and 50 ml of water. Boil gently for 10 min to complete the inversion of sucrose, then cool. Transfer to a 250-ml volumetric flask and neutralize with 1 N NaOH using phenolphthalein as indicator. Make up to volume.

Take an aliquot and determine the total sugars as invert sugars.

A-3.3 Calculation

- $$\text{mg of Invert sugar} \times \text{Dilution} \times 100$$
- a) Reducing sugars, percentage = $\frac{\text{Titre (x) of the sample} \times 100}{\text{mg of Invert sugar} \times \text{Dilution} \times 100}$
- b) Total sugars, percent by mass as invert sugars = Calculate as in (a) making use of the titre value obtained in the determination of total sugars after inversion
- c) Sucrose, percent by mass = Percentage of total invert sugars — percentage of reducing sugars (originally present) $\times 0.95$
- d) Total sugars, percent by mass = (Percentage reducing sugars + Percentage sucrose)

NOTE — If only an approximate value is required, sugar concentration may be calculated using the factor for Fehling's solution (see A-1.4.3) as given below:

$$\text{Reducing sugars, percent} = \frac{\text{Factor} \times \text{Dilution} \times 100}{\text{Titre} \times \text{Mass of the sample}}$$

APPENDIX B

[Table 1, Sl No. (vi)]

METHOD FOR DETERMINATION OF SODIUM NITRITE CONTENT

B-1. REAGENTS

B-1.1 Sulphanilamide — Dissolve 0.5 g of sulphanilamide in 100 ml hydrochloric acid (1 : 1) Store in the refrigerator.

B-1.2 N.E.D. — Dissolve 0.500 g of *N*-1 (nephthyl) ethylenediamine dihydrochloride in distilled water and dilute to 100 ml. Store in the refrigerator. (Discard, if discoloured.)

B-1.3 Standard Nitrite Solution — Dissolve 0.250 g sodium nitrite (A.R grade) in distilled water and dilute to 1 litre in a volumetric flask. Further pipette 1 ml into a 250-ml volumetric flask and dilute to volume with distilled water (1 mg/1 sodium nitrite).

B-1.4 Zinc Acetate Solution — Dissolve 22 g of zinc acetate dihydrate [Zn (CH₃COO)₂ · 2H₂O] and 2 ml of glacial acetic acid in water, dilute to 100 ml.

B-1.5 Potassium Ferrocyanide Solution — Dissolve 10.6 g potassium ferrocyanide in water and dilute to 100 ml.

B-2. PROCEDURE

B-2.1 Calibration Graph

B-2.1.1 Pipette 2.0, 4.0, 6.0, 8.0, 10.0 ml (2.0, 4.0, 6.0, 8.0, 10.0 mg sodium nitrite) of standard nitrite solution (B-1.3) into a series of 50-ml volumetric flasks. Add distilled water to each to bring the volume up to about 20-ml. To a further 50-ml volumetric flask add 20 ml distilled water to act as the blank.

B-2.1.2 To each flask add 5 ml sulphanilamide reagent and mix. Leave to stand for 10 minutes and then add 2 ml N.E.D. reagent and mix. Leave to stand for a further 10 minutes, dilute to volume.

B-2.1.3 Read the absorption of each solution at 540 nm in a 1 cm cell against the blank.

B-2.1.4 Plot calibration graph with absorption against the concentration of sodium nitrite in g/50 ml.

B-2.2 Method

B-2.2.1 Weigh 10 g of the minced sample and place in a mixer with 100 ml distilled water at 70°C. Macerate, then transfer the mixture to a 250-ml volumetric flask. Rinse the mixer with a little distilled water at 70°C and add the washings to the volumetric flask.

B-2.2.2 Keep the mixture on a water-bath, maintaining the temperature 70°C for 15 minutes.

B-2.2.3 Add 5 ml zinc acetate solution, mix and add 5 ml potassium ferrocyanide solution. Cool the mixture and dilute to 250 ml with cold, distilled water. Filter through a Whatman No. 42 filter paper, discarding the first few millilitres of the filtrate.

B-2.2.4 Pipette 20-ml filtrate (depending on the nitrite concentration) into a 50 ml volumetric flask, add distilled water to give an approximate volume of 25 ml. Into a further 50 ml volumetric flask, add about 20 ml distilled water to act as the blank. To each flask add 5 ml sulphanilamide reagent, mix and leave to stand for 10 minutes. Add 2 ml N.E.D. reagent, mix and leave to stand for a further 10 minutes, dilute to volume.

B-2.2.5 Read the absorption at 540 nm in a 1 cm cell against the blank containing the reagents.

B-2.2.6 From the calibration graph obtain the $\text{NO}_2/50$ ml in gram.

NOTE — Occasionally the sample filtrate may be slightly cloudy. If so, pipette an equal aliquot into a second 50 ml volumetric flask, and dilute to volume with distilled water. Read the absorption at 540 nm in a 4 cm cell against the reagent blank, and subtract this reagent from the reading obtained after colour development.

Calculation

$$\begin{aligned}\text{Sodium Nitrite} &= \frac{\text{g/50 ml (from graph)}}{10^6} \times \frac{250}{10} \times \frac{10^6}{\text{aliquot taken}} \\ &= \frac{\text{g/50 ml}}{\text{aliquot taken}} \times 25\end{aligned}$$

(Continued from page 2)

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